CSIR NEWS

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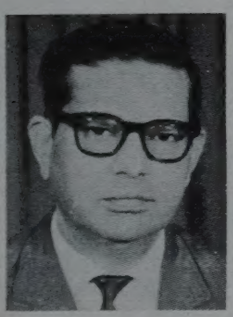
IGU's Award to Dr Hari Narain

The Indian Geophysical Union (IGU) has awarded its decennial award to Dr Hari Narain, Director, National Geophysical Research Institute (NGRI), Hyderabad, in recognition of his meritorious and distinguished services to the country in the field of geophysics.



A brilliant student of the Allahabad University, Dr Narain did his D. Phil. in 1950 from the Allahabad University and Ph.D. in 1954 from the Sydney University, Australia. On his return to India in 1956 he served the Oil & Natural Gas Commission (ONGC) till he became Director of NGRI in 1964. With meticulous planning, hard work and dedication, Dr Narain has brought the institute to a high level of scientific competence in many important fields of earth sciences. His own interests in gravity studies, seismology and airborne geophysics have resulted in the publication of more than 100 scientific articles.

Dr Narain was nominated a member of the National Committee on Science and Technology when it was first constituted in 1971 and he continues to be a member in charge of the natural resources sector. In addition to his responsibilities as the Director of NGRI, Dr Narain was Surveyor General of India from April 1972 to March 1976. During the last several years, Dr Narain has stressed the importance and need for an integrated policy for exploration, exploitation, and conservation of natural resources.

Dr Narain has been connected with a number of national and international institutions and conferences: chairman of the Working Group on Himalayan Region of the International Geodynamics Commission; chairman of the National Committee for IUGG; and chairman of the Research & Training Committee on Aerial Surveys of ECAFE in 1960.

During the last 20 years in ONGC and NGRI, Dr Narain has made signal contributions in different fields of geophysics. He has established very strong schools of research involving multidisciplinary techniques that have been extensively used for the development of natural resources in the country. This integrated approach is unique and has paid rich dividends. He was awarded Padma Shri in 1974. For his outstanding contribution to the growth and development of R & D in geophysics in India, Dr Narain was chosen for the decennial award. The award was given away on 30 December 1976.

Krishnan Medal for Dr Kaila

The Krishnan medal of the Indian Geophysical Union (IGU), for the year 1976, has been awarded to Dr K. L. Kaila, Scientist, National Geophysical Research Institute (NGRI), Hyderabad, for his outstanding contributions in the field of seismology and the structure of crust and sub-crust in parts of India. The award is given annually by IGU to an outstanding geophysicist below the age of 40.

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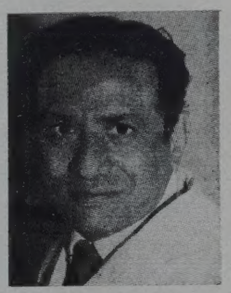
Padma Shri to Dr Jena & Dr Zaidi

Dr P. K. Jena



Dr S. H. Zaidi

Dr P. K. Jena, Director, Regional Research Laboratory, Bhubaneswar, and Dr S. H. Zaidi, Director, Industrial Toxicology Research Centre, Lucknow, have been chosen for the Presidential honour Padma Shri for the year 1977.

Dr Kaila, who started his career as a research assistant in the Delhi University in 1955, joined the Oil & Natural Gas Commission in 1956 and received training in oil exploration methods. In 1965, Dr Kaila joined NGRI and developed many new methods of approach for the preparation of quantitative seismicity maps, and a new analytical method for finding the upper mantle velocity structure and found out solutions for the hidden layer problem in seismic refraction work in oil exploration. Under the Indo-Soviet collaboration agreement, Dr Kaila was made the project coordinator of the Deep Seismic Sounding project in

1972. Under his direction, the project has made significant contributions to the knowledge of the Indian peninsular shield.

CSIR Society Reconstituted

The Society of the Council of Scientific and Industrial Research has been reconstituted for a period of two years ending with 31 August 1978 and consists of the following:

President

Prime Minister

Vice President

Shri P. N. Haksar
Deputy Chairman, Planning Commission, New Delhi 110001

Members

Shri C. Subramaniam
Minister of Finance, Government of India, New Delhi

Prof. S. Nurul Hasan
Minister of Education, Government of India, New Delhi

Shri K. C. Pant
Minister of Energy, Government of India, New Delhi

Dr Sankar Ghose
Minister of State for Planning, Planning Commission, New Delhi 110001

Dr M. S. Swaminathan
Secretary, Department of Agricultural Research & Education, Krishi Bhavan, New Delhi 110001

Dr R. Ramanna
Director, Bhabha Atomic Research Centre, Trombay, Bombay 400085

Dr B. V. Srikantan
Director, Tata Institute of Fundamental Research, Bombay 400005

Dr A. Ramachandran
Secretary to the Government of India, Department of Science & Technology, Technology Bhavan, New Mehrauli Road, New Delhi 110057

Prof. S. Dhawan
Director, Indian Institute of Science, and Secretary, Department of Space, Bangalore 560012

Dr Ramachandra Rao
Vice Chairman, University Grants Commission, Bahadur Shah Zafar Marg, New Delhi 110002

Prof. R. C. Mehrotra
Vice Chancellor, University of Delhi, Delhi 110007

Dr S. Varadarajan
Chairman, Indian Petro-Chemicals Corporation Ltd, Jawaharnagar, Baroda

Shri N. B. Prasad
Chairman, Oil & Natural Gas Commission, Tel Bhavan, Dehra Dun

Shri Mohd Fazal
Chairman & Managing Director, Engineering Projects (India) Ltd, Kailash Building, Kasturba Gandhi Marg, New Delhi 110001

Shri K. D. Mariwalla
Chairman, National Industrial Development Corporation Ltd, Chanakya Bhavan, Vinay Marg, New Delhi 110021

Dr S. K. Mukherjee
Director (Production), Fertilizer Corporation of India Ltd, 55 Nehru Place, New Delhi 110024

Brig. B. J. Shahaney
Secretary (TD) & Director General, Technical Development, Udyog Bhavan, New Delhi 110011

Shri B. B. Ramaiah
President, Sugar Technology Association, Andhra Sugar Limited, Tanuku (A. P.)

Dr A. R. Desai
Department of Sociology, University of Bombay, New Campus, Kalina, Bombay 400070

Dr P. C. Joshi
Institute of Economic Growth, University Enclave, Delhi 110007

Dr C. Gopalan
Director General, Indian Council of Medical Research, Medical Enclave, Ansari Nagar, New Delhi 110016

Prof. C. N. R. Rao
Solid State & Structural Chemistry Unit, Indian Institute of Science, Bangalore 560012

Shri S. M. Agarwal
Secretary to the Government of India, Ministry of Communications, Sardar Patel Bhavan, Parliament Street, New Delhi 110001

Smt. Serla Grewal
Additional Secretary and Commissioner, Department of Family Planning, Ministry of Health & Family Planning, Nirman Bhavan, New Delhi 110011

The following members of the Governing Body of CSIR are also members of the Society (CSIR) for the period for which they are members of the Governing Body:

Director General
Scientific and Industrial Research, Rafi Marg, New Delhi 110001 (Chairman, Governing Body)

Nominee of the Ministry of Finance, Government of India (Shri H. N. Ray, Finance Secretary)

Shri V. G. Rajadhyaksha
Chief Consultant & ex-officio Secretary, Planning Commission, Parliament Street, New Delhi 110001

Five Chairmen of the following Coordination Councils:

(i) Engineering Group
(To be notified later)

(ii) Chemical Sciences Group
(Dr G. S. Sidhu, Director, Regional Research Laboratory, Hyderabad 500009)

(iii) Biological Sciences Group
(Dr N. K. Jain, Director, Tocklai Experimental Station, Jorhat 785008)

(iv) Physical and Earth Sciences Group
(Dr Amarjit Singh, Director, Central Electronics Engineering Research Institute, Pilani 333031)

(v) Fibre Group
(Dr P. C. Mehta, Director, Ahmedabad Textile Industry's Research Association, Polytechnic P. O., Ahmedabad 380015

Exhibition on Survey, Conservation and Utilization of Resources

The Regional Research Laboratory (RRL), Bhubaneswar, at the request of the Indian Science Congress Association, organized an exhibition during the 64th Indian Science Congress session from 3 to 7 January 1977. The focal theme of the exhibition was survey, conservation and

Prime Minister Shrimati Indira Gandhi inaugurating the exhibition organized by RRL, Bhubaneswar, at Utkal University during the 64th Indian Science Congress Session

utilization of resources. The exhibition was inaugurated by Shrimati Indira Gandhi, Prime Minister of India, and President of CSIR, on 3 January 1977.

The exhibition covered two major areas: (i) Minerals, water, energy resources and related industries; and (ii) Agriculture, forest, fisheries, animal husbandry resources and related industries.

The Indian Institute of Petroleum (IIP), Dehra Dun, was one of the thirty organizations which participated in the exhibition. The exhibits in IIP pavilion related to (i) evaluation of crude oils with a view to selecting refinery processes and product pattern; (ii) survey on the production and consumption of petroleum products and demand forecasts to help the Government in refinery expansion programmes; (iii) optimization of the utilization of fuels and lubricants; and (iv) efficient utilization of fuels in domestic heating and lighting appliances and in industry.

VITM's Exhibition

An exhibition on 'Minerals in the march of the nation' was held at the Visvesvaraya Industrial and Technological Museum (VITM), Bangalore, in collaboration with the Geological Survey of India (GSI) to commemorate the 125th anniversary of GSI. The exhibition was inaugurated by the Governor of Karnataka, Shri Umashankar Dixit. Shri V. K. S. Varadan, Director General, GSI, presided over the inaugural function.

The exhibition displayed the ores and their end products with emphasis on their utility in the developmental programmes of the country. It was open to public for a period of one month from 10 December 1976 during which it attracted about 12,000 visitors comprising students, industrialists and scientists.

PROGRESS REPORTS

NEERI Annual Report : 1975

The annual report of the National Environmental Engineering Research Institute (NEERI), Nagpur, for 1975, published recently, shows that 125 projects, including 35 sponsored projects, were investigated during the year at the institute and its eight zonal laboratories. Areas covered by the projects were: Air pollution; Engineering; Epidemiology; Industrial wastes; Instrumentation; Life sciences; Sewage; Solid wastes; and Water. Work on 30 projects was completed.

As a collaborating centre of the World Health Organization (WHO), the institute continued to collect and transmit data on water supply, waste disposal and air pollution.

As a part of the national air sampling network programme, the institute continued to monitor air quality in eight major cities of the country. The study is expected to yield data to arrive at the permissible levels of common air pollutants under Indian conditions. A number of short-term air pollution surveys were undertaken during the year. One of these was a survey around the Taj Mahal and other national monuments at Agra as regards the possible harmful effects of the proposed Mathura Refinery.

At the request of the Calcutta Metropolitan Development Authority, the institute carried out air and water pollution surveys in the Calcutta-Howrah region. In another project, sponsored by the Bombay Municipal Corporation and the City and Industrial Development Corporation of Maharashtra, the institute carried out an extensive air quality survey of the Bombay city and the New Bombay area.

A significant achievement of the institute was its extension work on defluoridation of water in Prakasam district of Andhra Pradesh. One hundred and nineteen villages were covered under the programme. Groundwater in these villages had high fluoride contents (2-20 mg/litre). The institute demonstrated to the villagers as to how to treat the water by the 'Nalgonda technique', developed earlier by NEERI. The process is simple, easy to adopt and within the reach of the villagers. At the request of the Andhra Pradesh government, a pilot defluoridation project was undertaken with a door-to-door campaign in the villages to educate the rural masses on the treatment of fluoride-containing water.

Studies on charcoal powder as a filter aid to substitute the imported filter aids were completed. Studies on the performance of roughing filters and declining rate filtration were completed on a laboratory scale; follow-up

studies on full-scale plants were being continued.

Under a project coordinated by the WHO International Reference Centre for Community Water Supply, NEERI started experiments on slow sand filtration for small communities. The study is expected to yield the design parameters, operational guidelines and economics of such a plan. The laboratory also carried out studies on preventive maintenance of water distribution system in select zones in certain cities. A drag scraper for cleaning water mains was being developed. In another sponsored project, surface aerators of variable capacities for biological treatment of waste water were developed. Treatability studies were carried out for slaughter-house and citrus peel wastes.

A research-cum-demonstration pilot plant for night-soil digestion has been set up at the Central Prison, Nagpur, with a contributory population of eight hundred. The bio-gas generated (18-20 m^3/day with 55-65% of methane) is being utilized at the prison's canteen and kitchen. The data collected on the performance of the digester and treatment of the supernatant are expected to yield design parameters and operational criteria for night-soil digesters as a complete utilization system.

Feasibility studies for mechanical composting of city refuse were completed for Jaipur and Jodhpur, and initiated for Kota and Jabalpur.

In the field of instrumentation, the following environment monitoring equipment were fabricated and were under trial: (i) volumetric spore trap, (ii) wind direction recorder, and (iii) vacuum pump for air sampling—rotary vane type and bellows type.

Consultancy services were rendered to fifteen organizations. Some of the consultancy projects related to: effluent disposal from Patna Feeder Balancing Dairy; treatment of milk plant waste; installation of sewage treatment plant for a 5-star hotel; and treatment of cyanide wastes.

Seven training courses were organized at Nagpur, Lucknow, Calcutta, Madras and Bombay for technical personnel of various organizations. A special course sponsored by the Ministry of Railways was offered to the chief medical officers and senior civil engineers of Indian Railways.

Besides its regular publications, the institute brought out nine special publications. It also started bringing out publicity leaflets and brochures, and popular articles on its R&D activities in Hindi. Forty-four papers were published during this period.

CFRI's Progress of Research : 1975

The Central Fuel Research Institute (CFRI), Dhanbad, in its Progress of Research: 1975 (mimeographed), released recently, shows that 128 sub-projects were investigated, including 20 sponsored by outside organizations. The institute's work on coal quality assessment included the examination of over 12,000 m bore-hole core length and analysis of about 25,000 coal samples in seven coal survey laboratories of CFRI. The investigations indicate future possibilities of utilization, for steel-making, of coals from Barren Measure and newer areas of Jharia coalfield, as well as assistance in planning on coals, besides grading and industrial application by concerned organizations. Graphite in Palamau district of Bihar can also be upgraded and market survey on its uses and demand by various industries has been completed.

Schemes in coal washing comprised technical audit of performance of the existing coal washeries; development of flow schemes for proposed installation of plants at Kedla and Ramgarh (both in Hazaribagh district of Bihar); and recovery and upgrading of coking coal fines in slurry from newer sources by oleo-flotation and oil agglomeration techniques. Commercial viability tests of the techniques were taken up. With oil agglomeration, Bharat Coking Coal Ltd plans to set up a 2 tonnes/hr coal slurry beneficiation unit and Hindustan Steel Ltd envisages using up to 7.5 tonnes/hr direct coal injection in blast furnace to reduce coke consumption in the Bhilai Steel Plant. Oil flotation process will be used in the proposed Sudamdih Coal Washery of Bharat Coking Coal Ltd.

In coal-oil programme, a coal hydrogenation experimental plant (0.5 tonne/day coal charge) for production of synthetic oil is being set up. Work on a continuous 1 kg/hr bench scale coal hydrogenation unit was taken up. Raniganj coal was hydrogenated; although in comparison with Assam coal the conversion into oil was a little less, the result was encouraging. Hydrogenation studies of coal and coal-tar included development of catalysts, kinetics and mechanism of conversion, coking characteristics of heavy oil, hydrogenation of low-temperature tar middle oil, etc. Four Fischer-Tropsch projects included studies on synthesis of detergent from waxes.

In coal blending, work on conserving coking coals by using inferior coking coals in the manufacture of hard coke was continued. In view of the demands of coal blends in the coke ovens of expanding steel plants, especially Bokaro, very low volatile "O" seam Jharia coal (not tested earlier) up to 30% in admixture with washed Bhojudih and raw Mohuda coals (60 : 40) with 0.5% oil was found suitable for manufacture of hard coke. Even 50% "O" seam coal can be used in blends in producing hard coke for feeding smaller blast (low-shaft) furnaces. In all cases, laboratory work was followed by semi-pilot and pilot plant tests. Three-oven coal gas-fired high-temperature carbonization experimental plant (5 tonnes/hr coal charge), after 18 years of continuous operation, was renovated into an one-oven furnace oil-fired unit with all existing byproduct units. This oven is not required to be operated continuously and hence is more economical.

Processing of solid fuels for metallurgical/industrial/domestic uses progressed well. A CFRI-designed 350 tonnes/day formed coke plant at Talcher (Orissa) is expected to be commission-

ed by Coal India Ltd shortly. A 2 tonnes/hr fluid-bed carbonizer is being designed for experiment. Using lower-seam (V, VI and VII) coals of Jharia coalfield, Bharat Coking Coal Ltd is erecting a 100 tonnes/day pellet coke plant as developed by CFRI. Also, CFRI conducted successful pelletization tests using lower seam caking coal and washery middlings/sinks. The Bihar Government has commissioned CFRI to prepare feasibility report for setting up pellet coke plants in Bihar. Based on CFRI know-how, a formed coke plant (100 tonnes/day) using coke breeze from Rourkela Steel Plant coke ovens has been erected at Ghaziabad. Smokeless domestic fuel briquettes prepared successfully from washery middlings and coke breeze of Lodna Colliery, Jharia, have also been tested in a simple and inexpensively operated devolatilizer developed by CFRI. A report on low-temperature coal carbonization projects in India has been prepared by CFRI for the Synthetic Oil Committee. Installation of a low-temperature coal carbonization plant (1500 tonnes/day), based on CFRI know-how, near Calcutta is sanctioned.

In combustion, a collaborative project was entered into with Bharat Heavy Electricals Ltd on a 2 tonnes/hr fluid-bed combustor set up in CFRI for studying the effectiveness of different coals in raising steam. Development of paddy husk fired combustor-cum-preheater, sponsored by the Union Ministry of Food & Agriculture, has been completed and tested in a large rice mill in West Bengal. Also, assistance was rendered to the Central Water & Power Commission on linkage of collieries to thermal power stations and problems of coal quality.

Work on chemicals from coal included development of a multi-purpose nitrogenous organic fertilizer from coal. In commercialization of CFRI chemical processes, erections of a 30 tonnes/hr 4-cyanopyridine, from picoline, plant at Ahmedabad and a 150 tonnes/hr benzoic acid, from toluene, plant at Varanasi were completed.

Research on industrial carbon consisted of making 1 and 2 in. diam. dense, chemically and heat-treated carbon blocks for cathode lining in aluminium industry and blast furnace refractory. Carbon brushes having low abrasion loss, high density, higher electrical resistivity and lower current and voltage output were prepared from petroleum coke and graphite in different proportions with coal tar pitch as binder. For improving yield, ash reduction and electrical conductivity of pitch coke, high-temperature coal tar pitch was subjected to delayed coking, halogenation and treatment with alkali and acid solutions. The low-ash coke may substitute petroleum coke.

Work on catalysis resulted in the derivation of a principle based on the suggested mechanism for selection of active catalyst components. Its applicability has been experimentally demonstrated in several systems. The work has commercial utilization and import substitution value.

Continuing studies in coal science and systematics fundamentals have confirmed the earlier finding of the role of the hydroaromatic structure in coal. Studies on the nature of moisture provide a sounder basis for grading and pricing of coal.

Studies on utilization of wastes related to preparation of insulating bricks on laboratory scale with fly ash from coal-fired thermal power plants, and use of different organic and inorganic binders. A suitable clay, used as a substitute for costly binders, showed improvement in the properties of the bricks (porosity, 52-55%; cold crushing strength 80-130 kg/cm^2).

PROCESSES AND PRODUCTS READY FOR COMMERCIAL UTILIZATION

Porosimeter

Porosimeter is used for nondestructive measurement of porosity of rocks, ceramics, bricks, coals, sands, soils, powders, ores, wood, waste, etc. The National Geophysical Research Institute (NGRI), Hyderabad, has developed a porosimeter based on the gas laws. It comprises a funnel top, a stopper, a sample chamber and a graduated capillary tube connected in that order from top to bottom. The lower end of the graduated tube is connected by means of polythene tube to a movable mercury reservoir. The difference in heights of mercury column in the capillary tube with and without a sample in the sample chamber gives a measure of the grain volume and percentage porosity of the sample.

The instrument can receive specimens of suitable dimensions of up to 1 in. width and 4 in. length. It can be used for measurement of material porosity range not less than 2 to 3%. The reproductivity of results is ± 1 to 3% depending upon the bulk volume of the specimen.

The exact demand for the porosimeter has not been estimated as yet, but it is expected that with indigenous availability the demand may increase considerably.

All glass items, including the stop cock which is of high vacuum type, are made of pyrex glass. All the raw materials are available indigenously. The main equipment required are for glass blowing and fusing, and all these are available indigenously. Workshop facilities for wood working are also essential for fabrication of this instrument.

Due to relatively low turnover, it is necessary that the project should be taken up only by those firms which have necessary background, experience and standing in the glass blowing and fusing works with good working facilities. Checks for the airtightness and quality of mercury are essential.

The present cost of production per unit is Rs 2500. There is no equivalent item either manufactured or marketed in India. Porosimeters of foreign origin are not as simple as the present instru-

ment and their cost is around Rs 12,000 per piece.

Further particulars can be had from: The Managing Director, National Research Development Corporation of India, 61 Ring Road, Lajpat Nagar III, New Delhi 110024.

Rust Preventing Composition (Phosphating Jelly)

Phosphating of steel structure is generally done after removing rust and scale and before painting to prevent the structure from re-rusting, to promote good adhesion of paint, and to increase paint life. Re-rusting of steel structures, usually takes place during the period between the removal of rust and scale and painting unless pretreatments like phosphating are resorted to. In the case of erected steel structures which are derusted at site or in shop by sand or shot blasting, flame cleaning or by the use of rust and scale removing jelly, it is convenient to use a phosphating jelly which can be brushed on the surface like painting.

The Central Electrochemical Research Institute (CECRI), Karaikudi, has developed a formulation for the manufacture of phosphating jelly from cheaply and abundantly available indigenous raw materials. The jelly is based on plant carbohydrates and plant proteins, a cheap alkali metal phosphate, a mineral acid and a small amount of a commonly used fungicide.

The jelly has the following advantages: it can be applied with a fibre brush; it does not run off the surface on application; the active substance remains in contact with the metal surface for the period required; it can be washed off the surface with running water or by wiping with wet cloth; and its cost is very less.

The jelly can be applied to all types of steel structures, e.g. rolling stock such as vehicles, railway wagons, coaches, and stationary structures such as bridges and sheds.

Since phosphating of erected steel structures before painting has not come into vogue on a large scale in this country, it is difficult to estimate the future demand for this product. However, in view of the simplicity of the method of application and cheapness of the product developed, it is expected that the engineering industry will make wide use of this phosphating jelly when it is available in the market.

The process has been studied on laboratory scale only. The jelly prepared in the laboratory has been tested and the performance of the jelly has been found satisfactory. Plant carbohydrate, plant protein, alkali metal phosphate, mineral acids and fungicide are the main raw materials needed in the process. All these are available indigenously.

The essential items of plant and machinery are : glass-lined reactor and anchor type agitator, boiler, water pumps, and cooling tower.

The total capital outlay for setting up a plant capable of producing 630 tonnes of jelly per annum has been estimated at Rs 3,79,600. The cost of production has been worked out at Rs 1.96/kg.

Further particulars can be had from: The Managing Director, National Research Development Corporation of India, 61 Ring Road, Lajpat Nagar III, New Delhi 110024.

Bubble Chamber Scanner

The Central Scientific Instruments Organisation (CSIO), Chandigarh, has developed a bubble chamber scanner. The instrument is basically a triple projector with three identical film feeding units and associated systems. The negatives are projected on a horizontal white screen at low magnification, giving track images. The projection objective is designed for 70 × 90 mm^2 film format and is well corrected for distortion, yielding a crisp image. Controls are easily accessible and simple to operate. The condenser units and gate control system can be tilted up to 120° from its normal horizontal position, facilitating quick mounting of the film. Fast film transport is available both in forward and reverse directions and hence for a trained scanner it should take only a few seconds to decide if a particular frame contains anything of interest. The screen brightness is sufficient for easy viewing in sem-idark room.

The salient features of the bubble chamber scanner developed at CSIO are: (i) provision of electromagnetic friction brake assembly so as to prevent overshooting and curling of the film, (ii) incorporation of a timer in electrical controls such that friction brake operates only for 3 s, (iii) automatic operation of gate control as soon as scanning switch is released, and (iv) incorporation of arm assembly so as to render more adequate support to the film spool at its two ends as replacement to cantilever system.

A batch of six bubble chamber scanners has been fabricated at the institute for the Jammu, Panjab and Banaras universities. The performance of the bubble chamber scanner has been found equivalent to that of the imported Prevost unit (Italy).

The specifications of the instrument developed at CSIO are:

Overall image magnification	: 10 ×
Image size	: 1140 mm (d) corresponding to frame size of 70×90 mm^2
Space requirements	: 1.68×1.63×2.74 m^3
Operation on 220 V, 50c/s, ac supply	

In addition to the scanning of bubble chamber photographs, this instrument will be of considerable aid in experimental study of sub-atomic decays and interactions. The present annual demand for this instrument is 6 units. The future annual demand is estimated at 10-15 units.

Optical glasses of varied specifications, plate glass, heat resisting glass plate, ferrous and non-ferrous metals like mild steel rods, sheets, angles, channels, brass, aluminium and its alloys, and various electrical parts like relays, microswitches, resistors, capaci-

tors, transformers, push buttons, wires and a dc motor (115 V, 1/15 hp) having high torque are the components required. Except for reversible dc motor, all the raw materials are available indigenously.

Owing to relatively low turnover, it is suggested that an industry which is engaged in precision mechanics and can arrange for optical components should undertake fabrication of this instrument.

If made in batches of six, the cost is expected to be about Rs 20,000 per unit. The imported unit costs about Rs 60,000.

Further details can be had from: The Managing Director, National Research Development Corporation of India, 61 Ring Road, Lajpat Nagar III, New Delhi 110024.

PATENTS FILED

44/Del/76 : Development of reaction type soldering flux, S. K. Bhattacharya & A. K. Ray—CMERI, Durgapur.

45/Del/76 : High efficiency wick stove, A. L. Arora & T. H. Singh—IIP, Dehra Dun.

46/Del/76 : Improvements in or relating to a process of making a photosensitive paper for electrophotographic machines, P. C. Mehendru, D. C. Parashar & N. Kumar—NPL, New Delhi.

47/Del/76 : Thermistor velometer, K. M. Kaiser, B. C. Bhowmick, P. K. Mitra & S. Bagchi—CMRS, Dhanbad.

48/Del/76 : A process for electroplating of particles of powder mass, specially graphite powder with copper, silver or any other metal, J. Bhattacharya, B. N. Ghose & S. K. Singh—NML, Jamshedpur.

50/Del/76 : An electrochemical process for production of *p*-toluidine from *p*-nitrotoluene, H. V. K. Udupa, M. S. Venkatachalapathi & S. Chidambaran —CECRI, Karaikudi.

53/Del/76 : IIP impingement smokemeter for measurement of black diesel smoke, N. V. Iyer, B. K. Rana, H. S. Sewak, O. D. Sharma, B. P. Pundir, P. S. Phull & J. M. Dave—IIP, Dehra Dun.

54/Del/76: Improvements in or relating to the manufacture of semiconductor devices (dielectrically isolated monolithic integrated circuits), N. N. Kundu, H. S. Kothari, R. C. Dubey & B. R. Marathe—CECRI, Karaikudi.

57/Del/76 : A process for making non-wovens using polyvinyl alcohol as the binder, A. Majumdar, B.P. Chaliha & M. S. Iyengar—RRL, Jorhat.

58/Del/76 : A process for the production of sponge iron, D. N. Dey, A. K. Tripathy, A. K. Jouhari & P. K. Jena—RRL, Bhubaneswar.

62/Del/76 : One-litre capacity variable speed mechanically operated extruder for preparation of extrusions of substances like alumina hydrate, S. B. Grover, P. S. Phull & R. N. Ray—IIP, Dehra Dun.

66/Del/76 : A process for the synthesis of 9-11-seco-estradiol derivatives carrying substituents at position 3 and/or 11, P. L. Kole, S. Ray, V. P. Kamboj & N. Anand—CDRI, Lucknow.

67/Del/76 : Isolation of galactose binding proteins by affinity chromatography on guar gum after insolubilizing the latter, P. S. Appukuttan, A. Surolia & B. K. Bachhawat—IIEM, Calcutta.

68/Del/76 : A process for removing hexavalent chromium from chrome sludge produced in bichromate plants prior to its disposal, P. V. S. Viswanathan, C. Sankaran & P. R. Khangaonkar—NML, Jamshedpur.

69/Del/76 : An improved and versatile RF induction heater, A. K. Chopra & G. S. Sidhu—CEERI, Pilani.

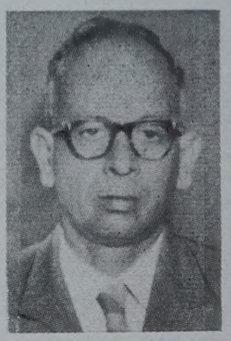
PERSONNEL NEWS

Appointments/Promotions

Dr K. S. Rajagopalan

Dr K. S. Rajagopalan of the Central Electrochemical Research Institute (CECRI), Karaikudi, has been appointed, on promotion, Scientist F at CECRI with effect from 23 December 1976. Dr Rajagopalan (born 15 Oct. 1923) had his education in Andhra (B.Sc., 1945) and Delhi universities (M.Sc., 1946; Ph.D., 1949). From 1946 onwards he served in various capacities at different laboratories.

Dr Rajagopalan visited UK during 1961-63 to undergo training on electrode kinetics, and corrosion and its prevention, in various laboratories of UK. He visited USSR on a study tour (March-May 1973), and as the leader of the Indian team (June-July 1975) to discuss the scope of cooperation between India and USSR in the field of corrosion and its prevention. He also visited USA in February 1976 to study the developments of corrosion protection measures in that country.



Dr Rajagopalan was appointed a UNIDO expert for three months in 1975-76 to assist the Government of Cuba in solving the problem of corrosion in cooling waters. He has organized research at CECRI in fundamental and applied problems in the field of corrosion and its prevention. He has to his credit 40 patents on anti-corrosion products and processes and has successfully tackled a number of industrial problems on corrosion, referred to by industrial units and government organizations. He has formulated theories of corrosion potential and polarization phenomena and has developed several new techniques for the study of corrosion, inhibition and passivity. His work on vapour phase inhibitors has received an award from the Inventions Promotion Board (NRDC).

Dr Rajagopalan had been the Secretary and the Vice President of the Society for Advancement of Electrochemical Science and Technology during 1964-69 and 1969-71 respectively, and editor of the society's journal during 1964-69. He was the convener of the Corrosion Research Committee of CSIR and is presently member of the Corrosion and Metals Research Committee of CSIR and the Corrosion Protection Sectional Committee of the Indian Standards Institution. He has published 152 research

papers and has prepared 39 reports and 40 reviews. He also has to his credit a book entitled 'Metallic Corrosion and Its Prevention'.

* * *

Dr Tapan Kumar Gangopadhyay assumed charge of the office of Curator (Chemical Engineering), Birla Industrial and Technological Museum, Calcutta (23 Dec. 1976).

* * *

The following personnel of the National Chemical Laboratory (NCL), Poona, have been promoted and transferred: Shri K. B. S. Prasad (as Scientist B to the Regional Research Laboratory, Hyderabad; 17 Dec. 1976), and Dr J. Biswas (as Scientist C to the Central Drug Research Institute Lucknow; 27 Dec. 1976).

Retirements

Dr M. U. Pai and Dr C. R. Narayanan, both Scientist E at NCL, retired (31 Dec. 1976).

Dr P. S. Rao

Dr P. S. Rao, Scientist E, Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar, now heads the All India Coordinated Project on Marine Algae sponsored by the Department of Science & Technology and not the Division of Marine Algae at CSMCRI as published under the 'PERSONNEL NEWS, column in *CSIR News*, **27** (1977), 7.

Vegetable Raw Materials for Steroid Hormones and Oral Contraceptives : NBG's Symposium

Under the auspices of the Department of Science & Technology, Government of Uttar Pradesh, the National Botanic Gardens (NBG), Lucknow, is organizing a symposium on 'Production and utilization of vegetable raw materials for steroid hormones and oral contraceptives' from 12 to 14 March 1977 at NBG. Further particulars can be had from the Director, National Botanic Gardens, Rana Pratap Marg, Lucknow 226001.

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH

Advertisement No. 2/77

It is proposed to appoint a Scientist F (Deputy Director) for the Central Glass & Ceramic Research Institute, Calcutta. The objective of the institute is industry-oriented scientific and applied research in the field of glass, ceramics, refractories, vitreous enamels and mica. Research and development activities of institute are directed towards: evaluation, beneficiation and utilization of the country's resources of related raw materials; import substitution, development of new products and processes, and adaptation of imported technologies relevant to the country's social, economic and industrial needs; improvement of glass and ceramic products and processes, development of new uses of mica, and rendering technical assistance to cottage scale industries and village pottery.

Job Requirements : This is a senior research management position and the incumbent will be required to provide high-level leadership in formulation, management, coordination and evaluation of the research programmes and related development and pilot projects relating to the areas mentioned in para I. He should be able to command the confidence of researchers in his field and the industry and be able to help in the transfer of research results from the institute to industry and be an able administrator and image builder to the institute.

Qualifications : High academic qualifications in glass technology, ceramic engineering, materials science, physics or chemistry, with adequate experience in R & D and or in industry at a high level.

Salary/Conditions of Service : The salary scale attached to the post is Rs 2000-125/2-2500. Initial pay will be fixed according to merit. The person selected will be appointed on a contract for a period of six years (including the probation period) after successful completion of probation period of two years. Other conditions of contract will be supplied on request.

Age Limit : Below 50 years, relaxable in special cases.

Scientists/technologists interested may obtain a standard proforma for sending their *curriculum vitae* from the Chief (Administration), Council of Scientific and Industrial Research, Rafi Marg, New Delhi-110 001. They can also obtain a brochure on the aims and objects and the latest annual report of the institute. Completed *curriculum vitae* proforma should be received in this office on or before 15 March 1977.

Canvassing in any form and/or bringing in any influence, political or otherwise, will be treated as a disqualification for the post.

Advertisement No. 5/77

It is proposed to appoint a Scientist F (Deputy Director) for the Central Drug Research Institute, Lucknow.

Job Requirements : This is a senior research management position and the incumbent will be required to provide high-level leadership to formulate plans and guide in the area of physiology of mammalian reproduction and fertility control. The incumbent will be responsible for planning, conducting, monitoring, evaluating and coordinating of research and development programmes and providing leadership to a large multi-disciplinary team of scientists in the area. He should be able to command the confidence of researchers in his field and the industry and be an able administrator and image-builder to the institute. He will be expected to provide assistance to the Director in the management of the institute and interaction with government and public bodies.

Qualifications : (i) High academic qualifications in endocrinology, reproductive physiology or related areas with a Ph.D. or M.D. degree and a consistently good academic career; (ii) Outstanding record of research and development in the field of specialization, and familiarity with modern methods and techniques (immunological) used in the field of research on mammalian reproduction and contraception as evidenced by research publications, books, monographs, patents, etc. At least ten years' experience in a responsible position in a R & D organization with proven ability to guide a research team.

Salary/Conditions of Service : The salary scale attached to the post is Rs 2000-125/2-2500. Initial pay will be fixed according to merit. The person selected will be appointed on contract for a period of six years (including the period of probation) after successful completion of probation period of two years. Other conditions of contract will be supplied on request.

Age Limit : Below 50 years, relaxable in special cases.

Scientists/technologists interested may obtain a standard proforma for sending their *curriculum vitae* from the Chief (Administration), Council of Scientific and Industrial Research, Rafi Marg, New Delhi 110 001. They can also obtain a brochure on the aims and objects and the latest annual report of the institute. Completed *curriculum vitae* proforma should be received in this office on or before 22 March 1977.

Canvassing in any form and/or bringing in any influence, political or otherwise, will be treated as a disqualification for the post.

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